WORKING PAPER

INTERNATIONAL CIVIL AVIATION ORGANIZATION

A35-WP/195[1]
TE/32
22/9/04

ASSEMBLY — 35TH SESSION

TECHNICAL COMMISSION

Agenda Item 23: **Consolidated statement of continuing ICAO polices and practices related to communications, navigation, and surveillance/air traffic management (CNS/ATM) systems.**

IMPACT OF THE NEW CNS TECHNOLOGIES ON UNDERDEVELOPED COUNTRIES

(Presented by 21 Contracting States[2], members of the Latin American Civil Aviation Commission)

SUMMARY

This paper contains a general analysis of the economic impact of introducing the new CNS technologies in underdeveloped countries.

REFERENCES

Documentation (WPs and IPs) of the 11th Air Navigation Conference (Montreal, Canada 2003)

1. INTRODUCTION

1.1 In the current aeronautical environment, it is commonly accepted that the Communications, Navigation and Surveillance (CNS) infrastructure must evolve in order to accommodate new functions and provide services with the appropriate capability, reliability and quality to support the changing requirements of Air Traffic Management (ATM).

[1] Spanish version provided by the Latin American Civil Aviation Commission (LACAC).

[2] Argentina, Aruba, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela.

1.2. To that end, ICAO has developed an implementation strategy which contemplates global coordination through the Global Air Navigation Plan for CNS/ATM Systems, and the development of the relevant SARPs, PANS and guidance material that reflect the pace of technological evolution, but which do not manage to define a lasting and homogeneous solution for the various air navigation scenarios at the regional and global levels.

1.3. In the absence of such a definition, small and underdeveloped countries are placed in an uncertain position *vis-à-vis* the implementation of new and expensive state-of-the-art solutions which are being constantly launched into the world market and that would enable them to keep pace with CNS/ATM developments, bearing in mind that the characteristics of their battered economies do not give them the possibility of planning their economic resources in a flexible and sustained manner, based on aeronautical development.

2. DEVELOPMENT

2.1 The operational definition that states that global ATM can be conceptually independent from technology has fostered the emergence of a broad range of new CNS technological systems which, according to the new ICAO standards, has increased the range of technological options for CNS/ATM implementation.

2.2 An example of this are the different implementation variants of:

a) Automatic dependent surveillance-broadcast (ADS-B), through VHF Mode 4 data link (VDL-M4), universal access transceiver (UAT), or secondary surveillance radar Mode S extended squitter (SSR ES or 1090).

b) Voice and data integration in the new digital network environments.

c) The various satellite-based augmentation systems (SBAS) of Global Navigation Satellite Systems (GNSS), namely: MTSAT, GAGAN, EGNOS, WAAS.

d) Controller-pilot data link communications (CPDLC), through VDL Modes 2, 3 or 4, SSR Mode S, UAT and satellite technologies (AMSS).

2.3 On the other hand, the rapid development of the technologies on which these aeronautical systems are based poses significant medium- and long-term planning challenges, since the already-installed systems quickly cease to meet the growing reliability and service requirements upon becoming outdated with respect to the new systems that appear in the market as a result of global industrial competition.

2.4 This has a significant impact on underdeveloped countries, where economic conditions hinder a consistent and coordinated follow-up of technological developments, and even the maintenance of conventional systems. As a result, CNS/ATM deficiencies identified by the FANS Committee more than 10 years ago still persist at the global level. The main factors to be considered include, *inter alia*: Investment cost of the ATM system (and of the CNS systems that support it), avionics unit costs, direct operating costs to users, and training of human resources.

2.5 In order to meet the technical and operational requirements imposed by air traffic growth and technological developments on the world of civil aviation, these countries are forced to make enormous economic and investment efforts. Likewise, the geographical position of the Flight Information Region (FIR) assigned to some of them may place them between adjacent FIRs of

developed countries with high ATM quality levels, and in order to keep pace with those levels, they must engage in a wild technological race on uneven conditions with respect to developed countries.

3. CONCLUSIONS

3.1 Although technological development cannot, nor should, be restrained, and although ICAO has proposed guidelines for the standardization of emerging technologies to counteract, insofar as possible, problems which might result from the many available standards, it is important to develop a strategy in face of the proliferation of new technologies, based on the adoption of system solutions which have proven to be safe, beneficial and justified from the economic and operational standpoints.

3.2. Furthermore, it is increasingly imperative to improve cooperation mechanisms among States, and to establish regional technical cooperation projects that will give poor and underdeveloped countries access to the necessary resources to develop their aeronautical technical infrastructure and their human resources in harmony and consistently with the global community, helping them to overcome the economic barrier that the accelerated development of the aeronautical industry represents for them.

4. ACTION BY THE ASSEMBLY

4.1 The Assembly is invited to:

a) take note of the information presented;

b) recommend ICAO to study the feasibility of the proposals contained in paragraphs 3.1. and 3.2. of this working paper; and

c) urge the regional planning and implementation groups (PIRGs) to objectively take into account the economic and operational conditions of the underdeveloped countries in their respective regions, in order to project the implementation of current and emerging technologies in a balanced manner, taking into account application scenarios and conducting cost-benefit and regional harmonization analyses.

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